

(FILE 'HOME' ENTERED AT 15:16:31 ON 26 FEB 2004)

FILE 'MEDLINE, CAPLUS, SCISEARCH, BIOSIS' ENTERED AT 15:18:49 ON 26 FEB 2004

L1	11529 S PHAGE (5A) DISPLAY
L2	103 S L1 (5A) ENZYME
L3	18 S L2 AND BACTERIOPHAGE
L4	18 DUPLICATE REMOVE L3 (0 DUPLICATES REMOVED)
L5	2666 S PHAGE (5A) ENZYME#
L6	248 S DISPLAY AND L5
L7	11082 S PHAGE DISPLAY
L8	864 S ENZYME (5A) DISPLAY
L9	93 S L7 AND L8
L10	23 S L9 AND FILAMENTOUS
L11	17 DUPLICATE REMOVE L10 (6 DUPLICATES REMOVED)

L4 ANSWER 1 OF 18 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 2003:892926 CAPLUS
 DN 139:359908
 TI Phage vectors comprising functional domain of major coat protein pVIII for display of antibody library
 IN Bowdish, Katherine S.; Barbas-Frederickson, Shana
 PA Alexion Pharmaceuticals Inc., USA
 SO PCT Int. Appl., 50 pp.
 CODEN: PIXXD2
 DT Patent
 LA English
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2003093471	A1	20031113	WO 2002-US14971	20020430
	W:				
	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW				
	RW:				
	AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR				
PRAI	WO 2002-US14971		20020430		
RE.CNT	4	THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD ALL CITATIONS AVAILABLE IN THE RE FORMAT			

L4 ANSWER 2 OF 18 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 2003:875418 CAPLUS
 DN 139:359894
 TI Phage vectors comprising functional domain of protein pIII for display of antibody library
 IN Bowdish, Katherine S.; Barbas-Frederickson, Shana
 PA Alexion Pharmaceuticals Inc., USA
 SO PCT Int. Appl., 61 pp.
 CODEN: PIXXD2
 DT Patent
 LA English
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2003091425	A1	20031106	WO 2002-US13610	20020426
	W:				
	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW				
	RW:				
	AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR				
PRAI	WO 2002-US13610		20020426		
RE.CNT	3	THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD ALL CITATIONS AVAILABLE IN THE RE FORMAT			

L4 ANSWER 3 OF 18 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
 AN 2003:308496 BIOSIS
 DN PREV200300308496
 TI A phage display-based method for determination of relative affinities of mutants. Application to the actin-binding motifs in thymosin beta4 and the villin headpiece.
 AU Rossenu, Stefaan; Leyman, Shirley; Dewitte, Daisy; Peelaers, Danny;

Jonckheere, Veronique; Van Troys, Marleen; Vandekerckhove, Joel; Ampe, Christophe [Reprint Author]
 CS Dept. of Biochemistry, Faculty of Medicine and Health Sciences, Ghent University, Baertsoenkaai 3, B-9000, Ghent, Belgium
 christophe.ampe@rug.ac.be
 SO Journal of Biological Chemistry, (May 9 2003) Vol. 278, No. 19, pp. 16642-16650. print.
 CODEN: JBCHA3. ISSN: 0021-9258.
 DT Article
 LA English
 ED Entered STN: 2 Jul 2003
 Last Updated on STN: 22 Aug 2003

L4 ANSWER 4 OF 18 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 2003:144427 CAPLUS
 DN 139:49006
 TI Bispecific monoclonal antibodies against a viral and an enzyme: utilities in ultrasensitive virus ELISA and phage display technology
 AU Liu, Fei; Guttikonda, S.; Suresh, M. R.
 CS Faculty of Pharmacy and Pharmaceutical Sciences, University of Alberta, Edmonton, AB, Can.
 SO Journal of Immunological Methods (2003), 274(1-2), 115-127
 CODEN: JIMMBG; ISSN: 0022-1759
 PB Elsevier Science B.V.
 DT Journal
 LA English
 RE.CNT 40 THERE ARE 40 CITED REFERENCES AVAILABLE FOR THIS RECORD
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 5 OF 18 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 2003:405260 CAPLUS
 DN 139:257263
 TI Efficient display of two enzymes on filamentous phage using an improved signal sequence
 AU Strobel, Heike; Ladant, Daniel; Jestin, Jean-Luc
 CS Paris, Fr.
 SO Molecular Biotechnology (2003), 24(1), 1-9
 CODEN: MLBOEO; ISSN: 1073-6085
 PB Humana Press Inc.
 DT Journal
 LA English
 RE.CNT 15 THERE ARE 15 CITED REFERENCES AVAILABLE FOR THIS RECORD
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 6 OF 18 SCISEARCH COPYRIGHT 2004 THOMSON ISI on STN
 AN 2002:857964 SCISEARCH
 GA The Genuine Article (R) Number: 603MK
 TI Phage display of functional human TNF-alpha converting enzyme catalytic domain: A rapid method for the production of stabilized proteolytic proteins for assay development and high-throughput screening
 AU Chen Y D; Diener K; Patel I R; Kawooya J K; Martin G A; Yamdagni P; Zhang X; Sandrasagra A; Sahasrabudhe S; Busch S J (Reprint)
 CS Aventis Pharmaceut Inc, Dept Funct Genom, Route 202-206, Bridgewater, NJ 08807 USA (Reprint); Aventis Pharmaceut Inc, Dept Funct Genom, Bridgewater, NJ 08807 USA
 CYA USA
 SO JOURNAL OF BIOMOLECULAR SCREENING, (OCT 2002) Vol. 7, No. 5, pp. 433-440.
 Publisher: MARY ANN LIEBERT INC PUBL, 2 MADISON AVENUE, LARCHMONT, NY 10538 USA.
 ISSN: 1087-0571.
 DT Article; Journal
 LA English

REC Reference Count: 25

ABSTRACT IS AVAILABLE IN THE ALL AND IALL FORMATS

L4 ANSWER 7 OF 18 CAPLUS COPYRIGHT 2004 ACS on STN

AN 2001:808940 CAPLUS

DN 136:163022

TI Identification of enzyme inhibitors from phage-displayed combinatorial peptide libraries

AU Kay, Brian K.; Hamilton, Paul T.

CS Department of Pharmacology, University of Wisconsin-Madison, Madison, WI, 53706-1532, USA

SO Combinatorial Chemistry and High Throughput Screening (2001), 4(7), 535-543

CODEN: CCHSFU; ISSN: 1386-2073

PB Bentham Science Publishers

DT Journal; General Review

LA English

RE.CNT 63 THERE ARE 63 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 8 OF 18 CAPLUS COPYRIGHT 2004 ACS on STN

AN 2000:812996 CAPLUS

DN 135:963

TI Construction and characterization of phage libraries displaying artificial proteins with random sequences

AU Nakashima, Toshihiro; Ishiguro, Naoki; Yamaguchi, Muneyoshi; Yamauchi, Asao; Shima, Yasufumi; Nozaki, Chikateru; Urabe, Itaru; Yomo, Tetsuya

CS Department of Biotechnology, Graduate School of Engineering, Osaka University, Suita, 565-0871, Japan

SO Journal of Bioscience and Bioengineering (2000), 90(3), 253-259

CODEN: JBBIF6; ISSN: 1389-1723

PB Society for Bioscience and Bioengineering, Japan

DT Journal

LA English

RE.CNT 24 THERE ARE 24 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 9 OF 18 CAPLUS COPYRIGHT 2004 ACS on STN

AN 2001:607833 CAPLUS

DN 136:305836

TI Phage display of enzymes

AU Yuan, Qiaoping; Newton, Dianne L.; Rybak, Susanna M.

CS Screening Technologies Branch, Division of Cancer Treatment and Diagnosis, National Cancer Institute, Frederick, MD, 21702, USA

SO Recent Research Developments in Biochemistry (2000), 2, 109-122

CODEN: RRDBAK

PB Research Signpost

DT Journal; General Review

LA English

RE.CNT 77 THERE ARE 77 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 10 OF 18 SCISEARCH COPYRIGHT 2004 THOMSON ISI on STN

AN 1999:716099 SCISEARCH

GA The Genuine Article (R) Number: 236AR

TI Processing and functional display of the 86 kDa heterodimeric penicillin G acylase on the surface of phage fd

AU Verhaert R M D (Reprint); vanDuin J; Quax W J

CS UNIV GRONINGEN, CTR PHARM, A DEUSINGLAAN 1, NL-9713 AV GRONINGEN, NETHERLANDS (Reprint); LEIDEN UNIV, LEIDEN INST CHEM, GORLAEUS LABS, NL-2300 RA LEIDEN, NETHERLANDS

CYA NETHERLANDS

SO BIOCHEMICAL JOURNAL, (1 SEP 1999) Vol. 342, Part 2, pp. 415-422.
 Publisher: PORTLAND PRESS, 59 PORTLAND PLACE, LONDON W1N 3AJ, ENGLAND.
 ISSN: 0264-6021.

DT Article; Journal
 FS LIFE
 LA English
 REC Reference Count: 24
 ABSTRACT IS AVAILABLE IN THE ALL AND IALL FORMATS

L4 ANSWER 11 OF 18 SCISEARCH COPYRIGHT 2004 THOMSON ISI on STN
 AN 1999:70123 SCISEARCH
 GA The Genuine Article (R) Number: 156EA
 TI Engineering, characterization and phage display of hepatitis C virus NS3
 protease and NS4A cofactor peptide as a single-chain protein
 AU Dimasi N; Pasquo A; Martin F; DiMarco S; Steinkuhler C; Cortese R;
 Sollazzo M (Reprint)
 CS IST RIC BIOL MOL P ANGELETTI, VIA PONTINA KM 30600, I-00040 POMEZIA, ROME,
 ITALY (Reprint); IST RIC BIOL MOL P ANGELETTI, I-00040 POMEZIA, ROME,
 ITALY
 CYA ITALY

SO PROTEIN ENGINEERING, (DEC 1998) Vol. 11, No. 12, pp. 1257-1265.
 Publisher: OXFORD UNIV PRESS, GREAT CLARENDON ST, OXFORD OX2 6DP, ENGLAND.
 ISSN: 0269-2139.

DT Article; Journal
 FS LIFE
 LA English
 REC Reference Count: 37
 ABSTRACT IS AVAILABLE IN THE ALL AND IALL FORMATS

L4 ANSWER 12 OF 18 SCISEARCH COPYRIGHT 2004 THOMSON ISI on STN
 AN 1998:516188 SCISEARCH
 GA The Genuine Article (R) Number: ZX265
 TI Engineering bidentate macromolecular inhibitors for trypsin and
 urokinase-type plasminogen activator
 AU Yang S Q; Craik C S (Reprint)
 CS UNIV CALIF SAN FRANCISCO, DEPT PHARMACEUT CHEM, SAN FRANCISCO, CA 94143
 (Reprint); UNIV CALIF SAN FRANCISCO, DEPT PHARMACEUT CHEM, SAN FRANCISCO,
 CA 94143
 CYA USA

SO JOURNAL OF MOLECULAR BIOLOGY, (19 JUN 1998) Vol. 279, No. 4, pp.
 1001-1011.
 Publisher: ACADEMIC PRESS LTD, 24-28 OVAL RD, LONDON NW1 7DX, ENGLAND.
 ISSN: 0022-2836.

DT Article; Journal
 FS LIFE
 LA English
 REC Reference Count: 23
 ABSTRACT IS AVAILABLE IN THE ALL AND IALL FORMATS

L4 ANSWER 13 OF 18 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 1999:119192 CAPLUS
 DN 130:333422
 TI Functional phage display of human interferon alpha 1c/86D
 AU Ma, Xuejun; Hu, Rong; Lu, Hai; Wei, Kaikun; Zhang, Lilan; Xue, Shuixing;
 Hou, Yunde
 CS State Key Laboratory for Molecular Virology and Genetic Engineering,
 Beijing, 100052, Peop. Rep. China
 SO Zhonghua Shiyuan He Linchuang Bingduxue Zazhi (1998), 12(3), 213-216
 CODEN: ZSLZFS; ISSN: 1003-9279
 PB Weishengbu Wuhan Shengwu Zhipin Yanjiuso
 DT Journal
 LA Chinese

L4 ANSWER 14 OF 18 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 1998:634548 CAPLUS
 DN 129:326177
 TI Somatostatin displayed on filamentous phage as a receptor-specific agonist
 AU Rousch, Mat; Lutgerink, Jan T.; Coote, James; De Bruine, Adriaan; Arends, Jan-Willem; Hoogenboom, Hennie R.
 CS CESAME at Dept. Pathology, Maastricht University, Maastricht, 6202 AZ, Neth.
 SO British Journal of Pharmacology (1998), 125(1), 5-16
 CODEN: BJPCBM; ISSN: 0007-1188
 PB Stockton Press
 DT Journal
 LA English
 RE.CNT 30 THERE ARE 30 CITED REFERENCES AVAILABLE FOR THIS RECORD
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 15 OF 18 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 1997:667632 CAPLUS
 DN 127:342262
 TI Technique for **phage** surface **display** as a useful tool in **enzyme** engineering
 AU Vanwetswinkel, Sophie
 CS Lab. Biochimie Physique Biopolymeres, UCL, Louvain-la-Neuve, B-1348, Belg.
 SO Chimie Nouvelle (1997), 15(59), 1818-1823
 CODEN: CHNOEE; ISSN: 0771-730X
 PB Societe Royale de Chimie
 DT Journal; General Review
 LA French

L4 ANSWER 16 OF 18 MEDLINE on STN
 AN 1998010354 MEDLINE
 DN 98010354 PubMed ID: 9350871
 TI **Phage display** selection of peptides against **enzyme** I of the phosphoenolpyruvate-sugar phosphotransferase system (PTS).
 AU Mukhija S; Erni B
 CS Departement fur Chemie und Biochemie, Universitat Bern, Switzerland.
 SO MOLECULAR MICROBIOLOGY, (1997 Sep) 25 (6) 1159-66.
 Journal code: 8712028. ISSN: 0950-382X.
 CY ENGLAND: United Kingdom
 DT Journal; Article; (JOURNAL ARTICLE)
 LA English
 FS Priority Journals
 EM 199802
 ED Entered STN: 19980226
 Last Updated on STN: 19980226
 Entered Medline: 19980219

L4 ANSWER 17 OF 18 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 1997:462957 CAPLUS
 DN 127:187785
 TI A phage display technique for a fast, sensitive, and systematic investigation of protein-protein interactions
 AU Rossenu, Stefaan; Dewitte, Daisy; Vandekerckhove, Joel; Ampe, Christophe
 CS Flanders Interuniversity Institute for Biotechnology, Department of Biochemistry, Faculty of Medicine, University of Ghent, Ghent, B-9000, Belg.
 SO Journal of Protein Chemistry (1997), 16(5), 499-503
 CODEN: JPCHD2; ISSN: 0277-8033
 PB Plenum
 DT Journal

LA English

L4 ANSWER 18 OF 18 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
 AN 1998:70844 BIOSIS
 DN PREV199800070844
 TI Display of functional thrombin inhibitor hirudin on the surface of phage M13.
 AU Wirsching, Frank; Opitz, Thomas; Dietrich, Ruediger; Schwienhorst, Andreas [Reprint author]
 CS MPI Biophysikalische Chem., Dep. 081, Am Fassberg 2, 37077 Goettingen, Germany
 SO Gene (Amsterdam), (Dec. 19, 1997) Vol. 204, No. 1-2, pp. 177-184. print. CODEN: GENED6. ISSN: 0378-1119.
 DT Article
 LA English
 ED Entered STN: 24 Feb 1998
 Last Updated on STN: 24 Feb 1998

=> d 14 15 all

L4 ANSWER 15 OF 18 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 1997:667632 CAPLUS
 DN 127:342262
 ED Entered STN: 22 Oct 1997
 TI Technique for **phage** surface **display** as a useful tool in **enzyme** engineering
 AU Vanwetswinkel, Sophie
 CS Lab. Biochimie Physique Biopolymeres, UCL, Louvain-la-Neuve, B-1348, Belg.
 SO Chimie Nouvelle (1997), 15(59), 1818-1823
 CODEN: CHNOEE; ISSN: 0771-730X
 PB Societe Royale de Chimie
 DT Journal; General Review
 LA French
 CC 3-0 (Biochemical Genetics)
 Section cross-reference(s): 6, 7
 AB A review, with 43 refs., of the phage display method and its possible applications in protein evolution and selection of new catalytic activities.
 ST review phage display genetic method; **enzyme** engineering
phage display method review; protein engineering phage display method review; library protein phage display method review
 IT Proteins, general, biological studies
 RL: BPN (Biosynthetic preparation); BSU (Biological study, unclassified); BIOL (Biological study); PREP (Preparation)
 (evolution; technique for **phage** surface **display** as a useful tool in **enzyme** engineering)
 IT Evolution
 (mol.; technique for **phage** surface **display** as a useful tool in **enzyme** engineering)
 IT Filamentous **bacteriophage**
 Genetic engineering
Phage display
 Phage display library
 (technique for **phage** surface **display** as a useful tool in **enzyme** engineering)
 IT Enzymes, biological studies
 RL: BPN (Biosynthetic preparation); BSU (Biological study, unclassified); BIOL (Biological study); PREP (Preparation)
 (technique for **phage** surface **display** as a useful tool in **enzyme** engineering)

L11 ANSWER 17 OF 17 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 1994:624986 CAPLUS
 DN 121:224986
 ED Entered STN: 12 Nov 1994
 TI **Phage display** of enzymes and in vitro selection for
 catalytic activity
 AU Soumillion, Patrice; Jespers, Jaurent; Bouchet, Michele;
 Marchand-Brynaert, Jacqueline; Sartiaux, Pascale; Fastrez, Jacques
 CS Lab. Biochem. Phys. Biopolymers, Univ. Catholique Louvain,
 Louvain-la-Neuve, B1348, Belg.
 SO Applied Biochemistry and Biotechnology (1994), 47(2-3), 175-90
 CODEN: ABIBDL; ISSN: 0273-2289
 DT Journal; General Review
 LA English
 CC 7-8 (Enzymes)
 AB Despite recent progress, the understanding of enzymes remains limited: the
 prediction of the changes that should be introduced to alter their
 properties or catalytic activities in an expected direction remains
 difficult. An alternative to rational design is selection of mutants
 endowed with the anticipated properties from a large collection of
 possible solns. generated by random mutagenesis. The authors describe
 here a new technique of in vitro selection of genes on the basis of the
 catalytic activity of the encoded enzymes. The gene coding for the enzyme
 to be engineered is cloned into the genome of a **filamentous**
 phage, whereas the enzyme itself is displayed on its surface, creating a
 phage enzyme. A bifunctional organic label containing a suicide inhibitor of
 the
 enzyme and a ligand with high affinity for an immobilized receptor are
 constructed. On incubation of a mixture of phage enzymes, those phages
 showing an activity on the inhibitor under the conditions of the experiment are
 labeled. These phages can be recovered by affinity chromatog. The design
 of the label and the factors controlling the selectivity of the selection
 are analyzed. The advantages of the technique and its scope in terms of
 the enzymes that can be engineered are discussed.
 ST review **phage display enzyme** engineering;
 beta lactamase **phage display**; subtilisin **phage**
display; protein engineering **phage display**
 review
 IT Virus, bacterial
 (**phage display** of enzymes and in vitro selection
 for catalytic activity)
 IT Enzymes
 RL: BAC (Biological activity or effector, except adverse); BPN
 (Biosynthetic preparation); BSU (Biological study, unclassified); BIOL
 (Biological study); PREP (Preparation)
 (**phage display** of enzymes and in vitro selection
 for catalytic activity)
 IT 9014-01-1P, Subtilisin 9073-60-3P, β -Lactamase
 RL: BAC (Biological activity or effector, except adverse); BPN
 (Biosynthetic preparation); BSU (Biological study, unclassified); BIOL
 (Biological study); PREP (Preparation)
 (**phage display** of enzymes and in vitro selection
 for catalytic activity)